Cardxchange: A Paperless Solution For Exchanging Business Cards

Mukul Hodarkar, Neeraj Dorle, Amol Thombre, Anant Mendjogi

Dept. of Computer Engineering,
P.E.S. Modern College of Engineering, Pune,
University of Pune,
India.

ABSTRACT

In this paper we have discussed about features and working of CardXchange application. CardXchange is an android based application which makes use of some of the cutting age technologies viz. NFC (Near Field Communication). Objective of this application is to enable Smartphone users to exchange contact information with each other taking advantage of NFC and/or Bluetooth. For mobile phones that support NFC we have used NFC for contact information exchange purpose, for others which do not support NFC, we have made the exchange through Bluetooth. Using this app, the user, not only shares his/her contact information with others, but also gets connected with them on the social networking sites like facebook, twitter etc. JSON (java script object notation) is used to handle the user's data in the application and to transfer the data from one device to other device. Connectivity with the social networking sites is handled with the help of OAuth protocol.

Keywords

Android, NFC, Bluetooth, JSON, OAuth.

1. INTRODUCTION

As technologies for handheld devices with open platforms have made rapid progresses recently, open-platforms such as Android are getting momentum. Mobile devices running on android OS are getting more and more popular. Today 36.7% of smartphone market is held by android phones. Even the average number of android applications released every month is 15,000! [1]. CardXchange is an android application which makes sharing of contact information very much easier than it was earlier. If you accumulate a ton of business cards and then find yourself losing them, we feel your pain. CardXchange aims to eliminate the middleman (i.e. paper) and let you exchange business cards through NFC. You just need to create your card by entering information such as your name, contact numbers, residential address, email addresses, office addresses etc. You can then share this card with others directly by tapping your device with the other person's device, provided the other person's device supports NFC. If it doesn't then we have provided an alternative facility of card sharing by using Bluetooth technology.

2. TECHNOLOGIES USED

2.1 Android Operating System

Android is a Linux-based operating system, which is open source. Google releases the code under the Apache License[2].

Android is designed primarily for touchscreen mobile devices such as Smartphones. It is the world's most popular mobile platform. CardXchange targets the API Level 16 which is popularly known as Android 4.1 or 'Jelly Bean'. The minimum API Level that the app supports is Level 8 which represents Android 2.2 Froyo.

2.2 What is NFC?

NFC stands for Near Field Communication [6]. NFC is a set of standards for Smartphone and similar devices to establish radio communication with each other by touching them together or bringing them into close proximity, usually no more than a few centimeters. The technology that NFC, at its core, is based upon is Radio Frequency Identification or RFID. NFC is based on a subset of the RFID standard. Unlike RFID, which works over short distances, NFC communications require devices and tags to be 'near.' Near means a few centimeters or close enough to 'tap.' NFC devices can also exchange messages, something RFID was not geared for. NFC is a set of short-range wireless technologies, typically requiring a distance of 10 cm or less. NFC operates at 13.56 MHz on ISO/IEC 18000-3 air interface and at rates ranging from 106 kbps to 424 kbps, and higher rates are expected in the future. NFC always involves an initiator and a target; the initiator actively generates an RF field that can power a passive target. This enables NFC targets to take very simple form factors such as tags, stickers, key fobs, or cards that do not require batteries.

2.3 JSON

JSON stands for Java Script Object Notation. It is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of the JavaScript Programming Language, Standard ECMA-262 3rd Edition - December 1999[7]. JSON is built on two structures:

1. A collection of name/value pairs. In various languages, this is realized as an object, record, struct, dictionary, hash table, keyed list or associative array.
2. An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence.

JSON is the best alternative to XML for storing data in files. It is easy to parse and access data stored in JSON format. In CardXchange application the data is accessed and transferred to other devices in the form of JSON objects.

3. SYSTEM IMPLEMENTATION

3.1 Overview of the working:

The CardXchange application provides the facility to easily create and store contact information in various forms like personal card, business card, company card.

When the application starts, user is provided with some functionalities to work with, some of these functionalities are:

3.2 Create cards:

This functionality is used to create contact cards for specific purposes. The 3 default card types provided in the application are:

1. **Personal card**: It is used to store personal contact information,
2. **Business card**: It is used to store business contact information,
3. **Company card**: It is used to store company's contact information.

There is another facility to add custom fields in the cards, making the card more useful.

These cards will get sorted automatically based on the card types.

3.3 Create Profiles:

This functionality helps to create profiles of the application user. Profiles are created to store the common and frequently required information of the user, such as name, phone numbers and Email addresses etc. so that there is no need to enter this information every now and then.

3.4 Synchronization with social networking sites:

The CardXchange application provides another feature of synchronizing your contacts with the social networking sites e.g. connecting with the person, whose contacts have been received, on facebook, twitter etc social networking sites.
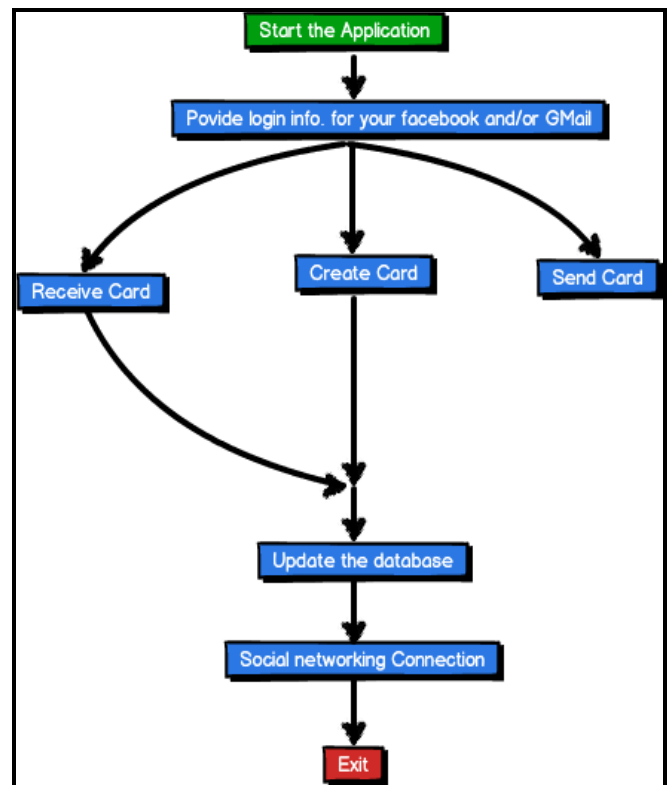

Figure 1 – Flow of application

3.5 Send/Receive:

Sending and receiving functionality makes use of NFC/Bluetooth service. For Send Card functionality, user is provided with two choices, send via NFC and send via Bluetooth. For mobile phones which do not support NFC, 'Send via Bluetooth' is selected by default.
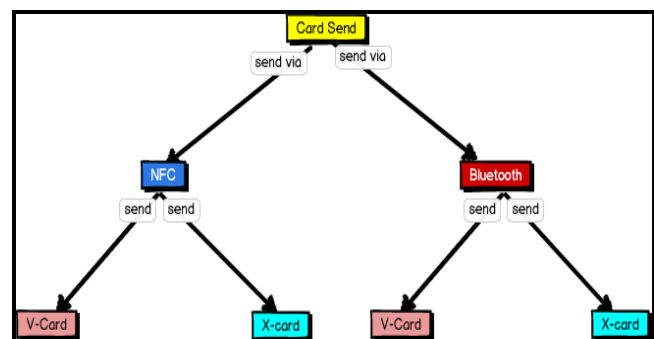

Figure 2 – Options available for 'Send Card' activity.

The Sending functionality provides two more option to which type of card to send. vCard and XCard are the two options provided. The 'vCard' is actually a file format standard for electronic business cards, while XCard is the electronic card, generated by CardXchange application itself. For those users who do not have CardXchange application in their mobile phones, we cannot send them the contact information in the form of XCard. So for those users option of sending vCard is provided in the application.

4. Algorithm:

1. Application starts.
2. Login information of facebook/Gmail account of the user is asked.
   2.1 OAuth Validation of the information is done.
   2.2 Validation complete/incomplete?
3. Logged in.
4. Create profiles
   4.1 Ask frequently required information.
   4.2 Store the information provided by the user.
5. Create Card
   5.1 Create Personal/Business/Company Card.
   5.2 Use information from the profiles if required.
   5.3 Enter the required information.
   5.4 Save
6. View Cards
   6.1 Select appropriate tab to view cards.
   6.2 Tap on particular card to view it.
7. Edit Card
   7.1 Show the stored information.
   7.2 Edit the information.
   7.3 Save.
8. Send Card
   8.1 Send via NFC
      8.1.1   Send vCard
      8.1.2   Send XCard
   8.2 Send via Bluetooth
      8.1.1   Send vCard
      8.1.2   Send XCard
   8.3 Show the devices in range.
   8.4 Select the devices to send the card.
9. Receive Card
   9.1 Card is received via NFC or Bluetooth.
   9.2 XCard is stored in applications database and if it is vCard, then it is stored in the phone memory contacts.
10. Automatic Synchronization (for connecting with social networking sites)
   10.1 If the 'Auto Sync.' in the settings is check marked, then directly connect with the social sites.
   10.2 If The 'Auto Sync.' in the settings is unchecked, then manually handle the connections with the social sites.

5. IMPROVEMENTS AND FUTURE WORK

5.1 Designing attractive user interface:

To make the user interface simpler, effective and attractive; we will make use of Sencha Touch and Phonegap mechanism for the front-end of the app.

5.2 Achieving platform independence - by Cloud solution:

Currently, the application is Android based. So to run the application, user should have a mobile phone which runs on android OS. This makes the application platform dependent. As the CardXchange app cannot run on any other platform than Android, the users having iphones, which run on iOS, or BlackBerry phones, which run on BlackBerry OS, are not able to make use of CardXchange application. So to make the application platform independent, we will make use of cloud service as a solution.

5.3 Merging of contacts:

Currently the received contacts in the form of XCards, are getting stored in the application's database, while the contacts in the form of vCards are getting stored in the phone memory's contacts itself.

In future, the application will directly save all the received contacts in the phone memory's contacts and a backup of all these contacts will be saved in the application's database.

5.4 Security enhancements:

1. Option will be provided at the time of receiving to accept or reject the card.
2. Encryption of card information while sending:
   The card information will be first encrypted before sending process takes place. This step will safe guard the information of the user from getting into wrong hands.

6. ACKNOWLEDGEMENT

7. CONCLUSION

We can see from this paper, that there is immense potential in this application which makes use of NFC for the purpose of easy and fast Data transfer. We believe that CardXchange represents a significant step forward in the execution of NFC/Bluetooth applications on Android smartphones. The implementation has been kept simple and also the conventional user experience has been maintained making it user-friendly. We are optimistic that the capabilities of the application will expand as hardware, NFC chips etc. become more sophisticated and more features will be added as stated in future scope.

8. REFERENCES

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[5]   http://www.androidhive.info/

[6]   http://www.tappednfc.com/android-nfc-developer-guide/

[7]   http://www.json.org/